

MAP 4170  
Test 3 Date:

Name: \_\_\_\_\_  
November 21, 2006

Each problem is worth 10 points.

1. A 10 year \$1000 par value bond with a coupon rate of 8% payable semiannually and redeemable at \$1200 is bought to yield 7% convertible semiannually. This bond is bought at a
  - (A) premium of \$28
  - (B) discount of \$28
  - (C) premium of \$71
  - (D) discount of \$172
  - (E) premium of \$172
  
2. Two \$1000 par value bonds redeemable at par at the end of the same period are bought to yield 4% convertible quarterly. One bond costs \$1098 and has a coupon rate of 5% payable quarterly. The other bond has a coupon rate of 3% payable quarterly. Find the price of the second bond.
  - (A) 902
  - (B) 926
  - (C) 950
  - (D) 976
  - (E) 1000

3. A 1000 par value bond is bought to yield an annual effective rate of 4%. The bond has three years to maturity and pays 5% nominal semi-annual coupons.

Compute the amount of write-down in the coupon paid 1 year after purchase.

- (A) 4.62
- (B) 4.71
- (C) 4.80
- (D) 4.90
- (E) 5.00

4. Susan can buy a zero coupon bond that will pay 1000 at the end of 12 years and is currently selling for 624.60. Instead she purchases a 6% bond with coupons payable semi-annually that will pay 1000 at the end of 10 years. If she pays  $X$  she will earn the same annual effective interest rate as the zero coupon bond.

Calculate  $X$ .

- (A) 1164
- (B) 1167
- (C) 1170
- (D) 1173
- (E) 1176

5. A ten-year 100 par value bond pays 8% coupons semiannually. The bond is priced at 118.20 to yield an annual nominal rate of 6% convertible semiannually.

Calculate the redemption value of the bond.

- (A) 97
- (B) 100
- (C) 103
- (D) 106
- (E) 109

6. A 30-year bond with a par value of 1000 and 12% coupons payable quarterly is selling at 850.

Calculate the annual nominal yield rate convertible quarterly.

- (A) 3.5%
- (B) 7.1%
- (C) 14.2%
- (D) 14.9%
- (E) 15.4%

7. A borrower is repaying a loan of 300,000 by the sinking fund method. The sinking fund earns an annual effective interest rate of 6.75%. Payments of \$22,520 are made at the end of each year for 20 years to repay the loan. These payments consist of both the interest payment to the lender and also the sinking fund deposit.

What is the annual effective interest rate paid to the lender of the loan?

- (A) 4.0%
  - (B) 4.5%
  - (C) 5.0%
  - (D) 5.5%
  - (E) 6.0%
8. A loan is being amortized with payments at the end of each quarter for 25 years. If the amount of principal repaid in the third payment is \$100, find the total amount of principal repaid in the forty payments consisting of payments eleven through fifty. Interest is at the rate of 8% convertible quarterly.
- (A) 7000
  - (B) 7075
  - (C) 7150
  - (D) 7225
  - (E) 7300

9. A 30-month loan is to be repaid with equal installments at the end of each month. The amount of interest paid in the seventh installment is \$203. The amount of interest paid in the nineteenth installment is \$175. Calculate the amount of interest in the twenty-fifth installment.
- (A) 83  
(B) 93  
(C) 104  
(D) 114  
(E) 125

10. June borrows 20,000 from April and agrees to repay it with a series of ten installments at the end of each year, such that each installment is 15% greater than the preceding installment. The rate of interest on the loan is 10% annual effective. Let  $P_j$  denote the amount of principal repaid in year  $j$ .

Calculate  $P_1 + P_2$ .

- (A) 180  
(B) 90  
(C) 45  
(D) -90  
(E) -180